Final Report
Drawer

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SCOTT RIVER

CORRIDOR ENHANCEMENT PROJECT

Funded by the

United States Fish and Wildlife Service

A Final Report for Project # 95-HR-21 / 9

Agreement # 14-48-0001-95625

Completed on January 31, 1997

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BACKGROUND: The Scott River drainage, located in Scott Valley, is a tributary to the Klamath River. Elevation of the headwaters reach 8,000 feet while Scott Valley, the private sector, sits at 2,900 elevation. The Scott River continues to be a major fish producing tributary to the Klamath River supporting Chinook, Coho, and Steelhead. Yet, like most north coast streams, the Scott River has experienced a decline in the return of adult anadromous fish. The Siskiyou Resource Conservation District and Scott River CRMP have chosen to be proactive in rehabilitating the Scott River watershed and appreciates the assistance provided by the US Fish and Wildlife Service.

Scott River runs through both public and private property. The head waters and lower canyon stretch are mostly public property within the USFS jurisdiction, while the foothills and valley floor are private. Private property is dominated by agriculture on the valley floor while timber interests and residential property are located in the foothills. The project site funded by the USFWS is located in the middle of the valley floor where the gradient of Scott River drops only 1 foot per 1000 feet. The restoration project took place on properties owned by David Black and Pat Davidson. David Black raises organic hay and wheat while Pat Davidson leases the property for raise cattle and hay production.

Alteration of the Scott River watershed began in the 1850's when gold was discovered in the head waters. Heavy placer and hydraulic mining continued until the 1940's. Nearly a century of placer mining stream banks dramatically increased sediment loads which is still evident today. In 1938 the Army Corps of Engineers channelized the river by adding levees through the project reach located in the center of Scott Valley. The Army Corps also straightened the channel and developed drainage ditches in order to further increase drainage during the winter months in order to protect agricultural and residential areas.

Since construction of the levees, the river banks have continued to erode creating a wide, shallow stream. Older locals say the river channel was only 80 feet wide prior to the installation of levees, now the active channel is over 200 feet wide in many locations. The loss of the Scott River flood plain throughout this area has increased the rivers velocity during high flow periods, which increased bank erosion to the point that riparian zones could not establish. High water velocities, rapid erosion, water table fluctuation, and riparian grazing have not allowed trees and shrubs to become heavily established along the river banks. The best riparian areas throughout the section are where successful bank stabilization projects have occurred. Stabilized banks prevent high water velocities from eroding the root base of young trees. Livestock exclusion and initial irrigation of trees after planting mitigate the limiting factors which have reduced the riparian zone along the Scott River. Observation has found that propagation of a riparian area does occur after it has been established within this river section. Expected reason for continued propagation after establishment is due to collection of fine silt (high water holding capacity), increased shade and protection from browsing and weather extremes.

The project site was characterized by a shallow channel depth and lack of shade which contributes to increased stream temperature during the low flow summer months. Channel bottom diversity was low due to high sediment loads and a lack of large woody debris. Holding and rearing pools for salmon and steelhead were as few as 1 pool per every 1/2 river mile throughout this section. The goal of the project was to establish a riparian zone which would stabilize banks, provide shade, channel complexity and trap sediment in order to confine the channel.

Described below is the development of a multi-agency funded project which would address the major impairments of the Scott River throughout this section. The combination of several funding sources throughout the 1.8 mile section is called the Eller Lane Project. Funding sources include the California Department of Fish and Game, US Fish and Wildlife Service, Wildlife Conservation Board, and the North Coast Regional Water Quality Control Board (EPA generated funding).

FUNDING SOURCE(S): The original intent of the funding from the California Department of Fish and Game was to install cattle exclusion fencing and plant trees to establish a riparian zone on property owned by Dave Black, the upstream property owner within the Eller Lane Project. The project goal was to create shade, trap sediment, and reduce bank erosion. After further examination of the severity of erosion, it was agreed upon by the Siskiyou Resource Conservation District and the California Department of Fish and Game, that bank stabilization efforts beyond tree planting should be done to arrest erosion. An amendment to install instream habitat improvement structures/bank stabilization structures was accepted by the CDF&G.

During the project scope reorganization, the Siskiyou RCD received funding from the Wildlife Conservation Board for planting and fencing on the Hansen Family property as well as funding from the US Fish and Wildlife Service for instream enhancement/bank stabilization structures, planting and riparian fencing on Dave Blacks property as well as property owned by Pat Davidson. A grant was also received from the NCRWQCB aimed at improving water quality related to warm temperatures and sediment levels. The scope of the NCRWQCB funding was to provide permanent livestock watering sources outside of the riparian area which was previously used before the Eller Lane Project. With assistance from CDF&G and the Natural Resource conservation Service, the Siskiyou RCD developed a single rehabilitation project which would cover 1.8 contiguous river miles. The endeavor was hereafter called the Eller Lane Project which extended through the property of Dave Black, Pat Davidson, and the Hansen family. In sum, the Eller Lane Project would stabilize nearly 3,800 feet of eroding bank, create dozens of scour pools, increase channel diversity, exclude livestock from 1.4 miles and plant over ten acres of irrigated cottonwood, willow and ponderosa pine to develop a riparian zone within the stabilized banks.

FISH AND WILDLIFE FUNDING: The funding from the US fish and Wildlife Service was used to construct 25 bank stabilization/in-stream habitat improvement structures, plant 3.5 acres and install riparian fencing on portions of property owned by Dave Black and Pat Davidson. The bank stabilization/instream structures (commonly called deflectors) are composed of tress with root wads, and large boulders. Deflectors are structures designed to protect banks from eroding by "deflecting" water velocity away from the bank while creating scour pools (a drawing is attached). Large boulders and trees with root wads were also randomly placed in the channel where the riparian zone is mature and banks are stable. Random boulder placement and trees secured by boulders created additional scour pools and increased channel complexity which supplies additional cover for fish. The RCD purchased quarry rock ranging from six inches in diameter to over four feet to construct the structures.

Carl Harral, Contract Administrator for the Department of Fish and Game, chose to place deflectors throughout the project for two reasons: an alternative stabilization method (other then riprap) which improved in-stream diversity was desired and the bank swallow (A State threatened specie) were using some of the cliff like banks for nesting habitat. The structure of the cliff like banks cannot be destroyed in order to provide continued nesting habitat. The deflectors are anchored into the eroding banks and extend perpendicularly into the stream. The tip of the deflectors create a scour pool and cover for fish to hold in while the deflector pushes the flow away from the cut bank creating slow water along the bank which reduces erosion. Deflectors placed within bank swallow habitat could not destroy the vertical bank. Therefore, the deflectors had to be constructed with a vertical face as they were built in to the bank.

Depending on the rate of erosion, deflectors were placed 60 to 75 feet from one another. They extend out into the channel approximately 15-18 feet and back into the bank roughly 15 feet. Willow branches were placed throughout the structures to increase bank vegetation in the future. In order to develop riparian zones throughout the project site, the USFWS and Wildlife conservation Board (WCB) provided funding for the planting of over ten acres of trees along the river bank and setback areas. The tree plantings are watered through a drip irrigation system during the summer months until root systems are established. The Siskiyou RCD also planted over 200 willow and cottonwood posts (3" to 7" diameter and five feet long) along the rivers edge in order to more quickly develop trees which will trap sediment and reduce high flow velocities along the bank. Cattle exclusion fencing provided by funding from the USFWS and WCB will also be used to protect the plantings from browsing and trampling throughout the area stabilized by deflectors.

US FISH AND WILDLIFE SERVICE PROJECT RECAP: The project goal is to create holistic rehabilitation of a 1.8 mile river corridor. Funding from the USFWS was used to stabilize one thousand nine hundred feet of rapidly eroding banks and create holding and rearing pools, plant 2,400 native trees over 3.5 acres and construct/improve riparian fencing throughout project site. Erosion estimates from the NRCS office during the late 1980's suggest just over one foot of soil is eroding along the outside of meanders per year within this section. Banks are composed of small sized materials including silt, sand and loam. One foot of erosion per year along 1,900 feet of river bank (banks are 10 to 15 feet tall) contributes nearly 1,000 cubic yards of sediment directly into the system each year.

Eight to ten years from now the project site is expected to have stabilized banks, additional and/or enhanced holding pools for fish, and a riparian zone which shades the river. The site has already experienced several high water events. Most areas along the banks have not eroded evidenced by annual weeds which are still present along the banks. There are two specific locations which are experiencing considerable, possibly increased erosion. Continual monitoring by the landowner and the Siskiyou RCD will determine cause and erosion severity in the future. The Siskiyou RCD is intending to continue to develop and use deflectors as an alternative method for bank stabilization while also directly improving fishery habitat. In order to determine effectiveness of the project, the RCD has established several photo points.

Juvenile chinook salmon and adult steelhead have been sighted holding within the project site during the spring of 1996 while steelhead juveniles used the structures all year. The site has experienced several high water events including a 30+ year flood. One deflector has partially failed and several hundred one year old trees were scoured from two planting locations. Some exclusion fence damage has occurred from debris collection in locations where flood water ran perpendicular to the fence. In sum, the project held extremely well during a sensitive period when the riparian plantings were only one year old. Most areas along the banks have not eroded as evidenced by annual weeds which are still present on the banks. Continued monitoring and small design changes with technical assistance from the Department of Fish and Game and the Natural Resource Conservation Service will improve deflector design for future projects to be implemented within the Scott River drainage.

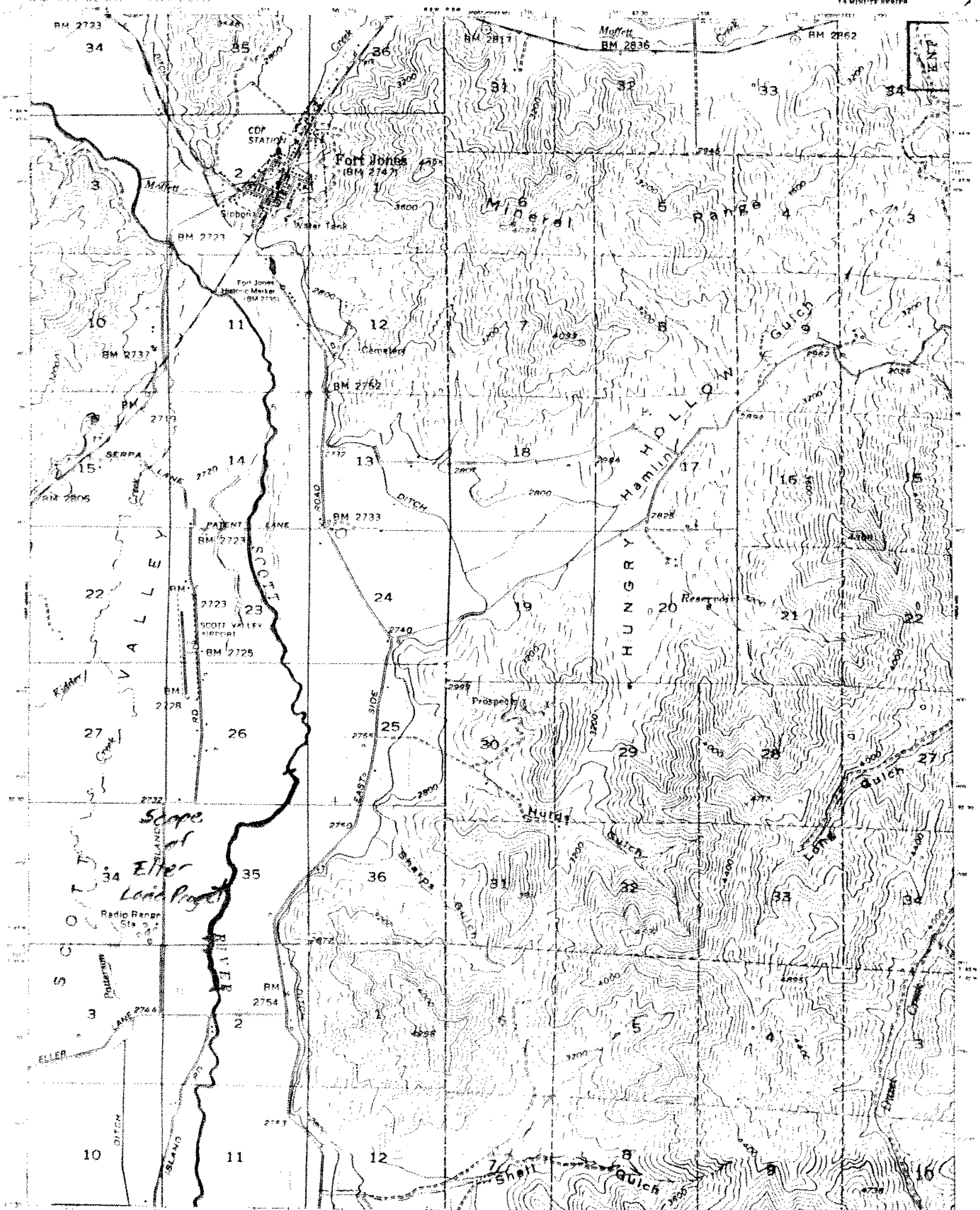
Demonstration of Alternative Bank Stabilization Methods
Agreement # 14-48-0001-95625
Project 95-HR-21

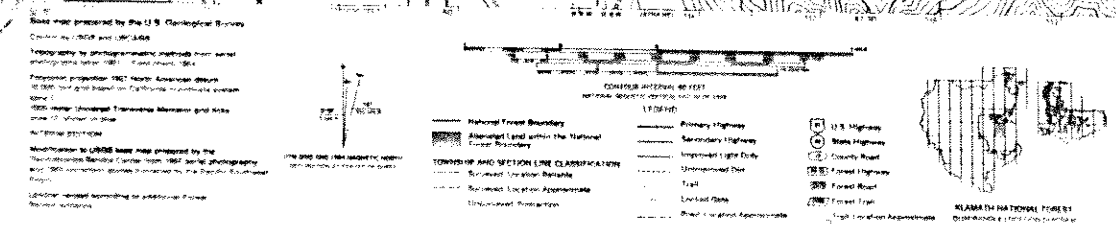
Final Budget - As Amended

SALARIES:		
Project Coordination		$ 1,777.50
Sub Contractor - Bank Stabilization/In Stream Structures		$13,990.25
Sub Contractor - Riparian Planting		$ 858.25
	Sub Total	**$16,626.00**
TRAVEL:		
Project Coordination		$ 140.50
	Sub Total	**$ 140.50**
MATERIALS:		
Fill Rock & Large Boulders		$18,754.13
Trees W/ Root Wads		$ 2,000.00
Plantings/Irrigation System		$ 9,980.23
Fencing		$ 481.85
	Sub Total	**$31,216.21**
OPERATIONS:		
Materials Transportation		$ 1,887.29
	Sub Total	**$ 1,887.29**
ADMIN. EXPENSE:		
10% Administration Cost		$ 4,987.00
	Sub Total	**$ 4,987.00**
	Project 95-HR-21 Cost	**$54,857.00**
	Project 95-HR-21 Budget	$54,857.00
Addition of Funds From Locally Built Fish Screens		**$ 1,083.58**
	Total Project Cost	$55,940.58

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
MODIFIED FOR USDA FOREST SERVICE USE

FORT JONES SE QUADRANGLE
CALIFORNIA
15 MINUTE SERIES





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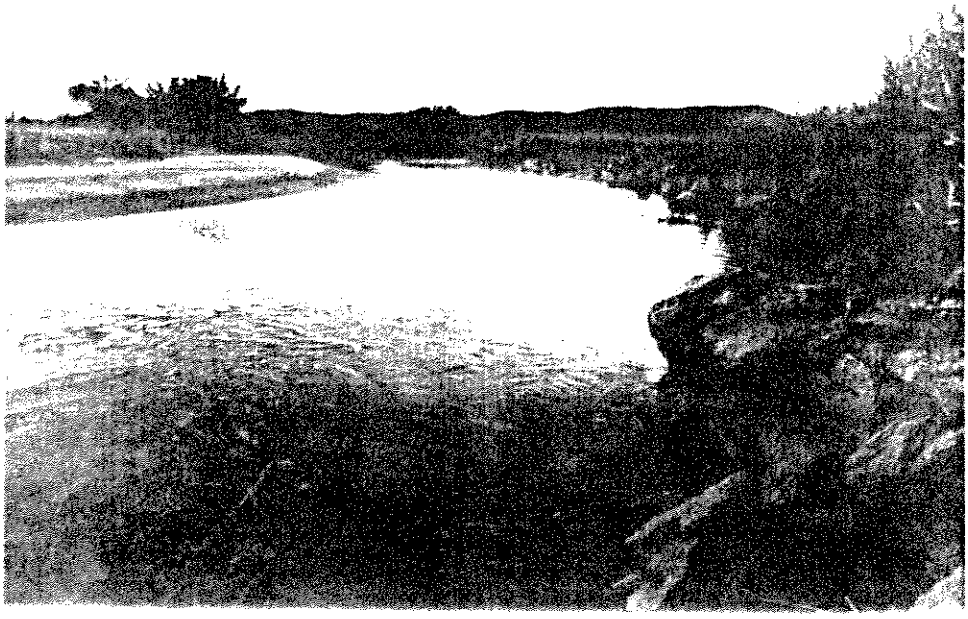


Figure 1. Typical deflector structures within the Eller Lane Project which includes the Hansen Property

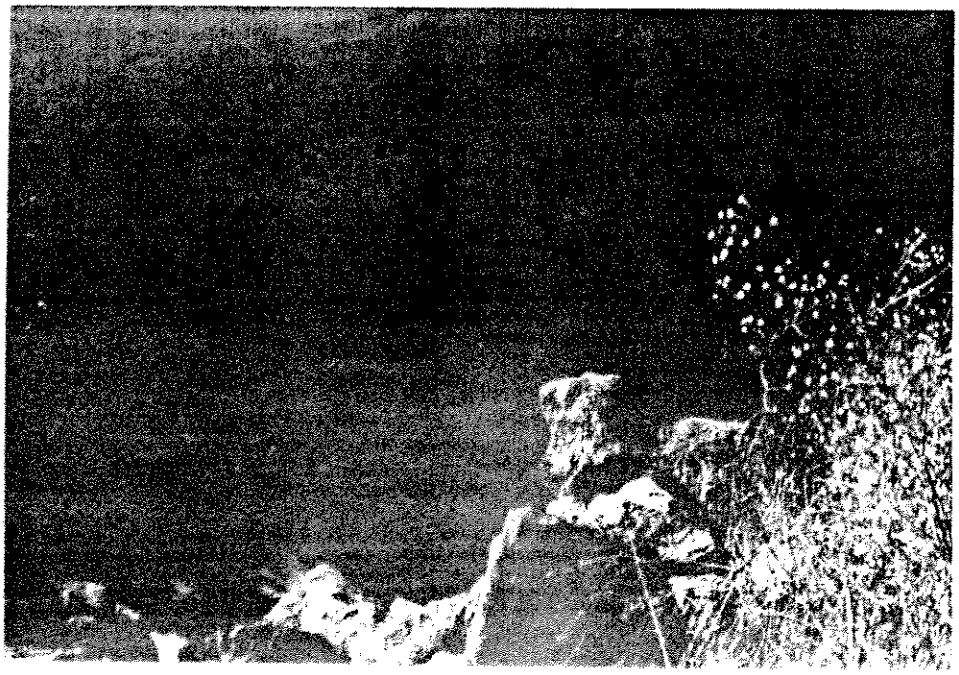


Figure 2. Structure within project site with adult chinook holding before moving upstream to spawn

Figure 3. Riparian fencing and "silt baffle" layout on southern end of planting site.

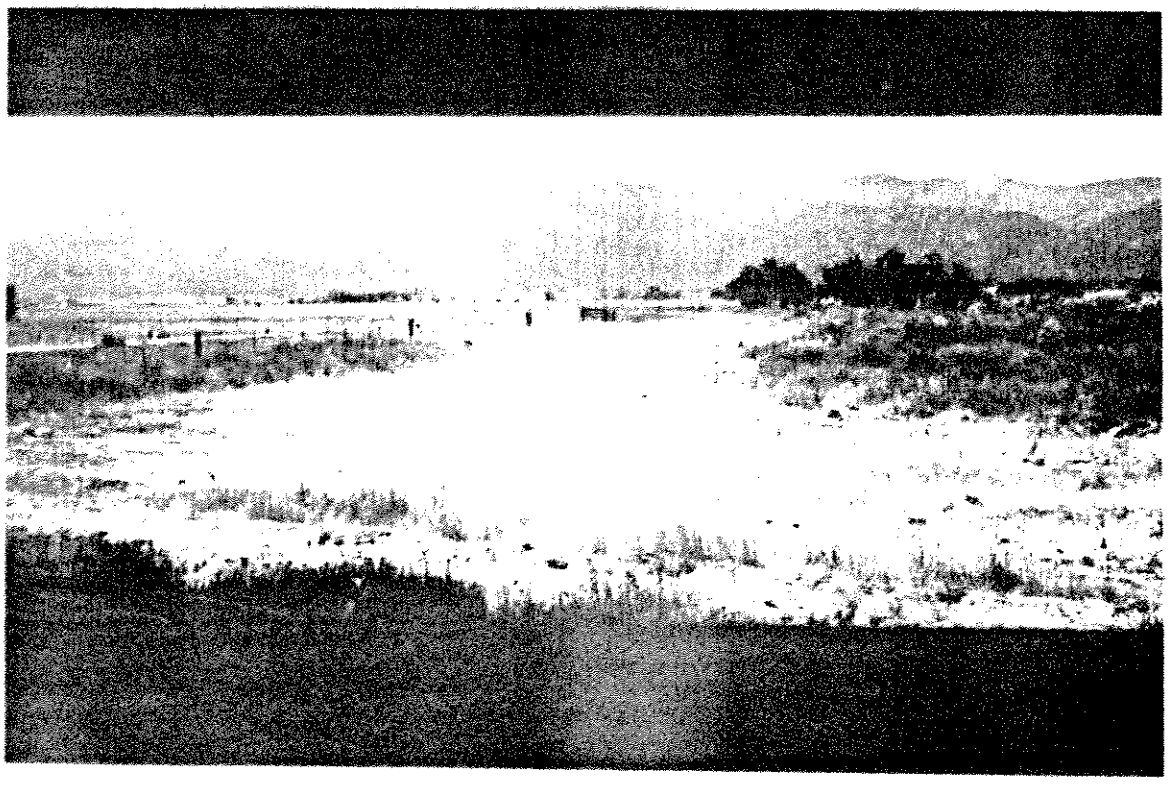


Figure 4. Large set aside area prepared for tree planting

Figure 5. Willow planted next to a bank stabilization structure.

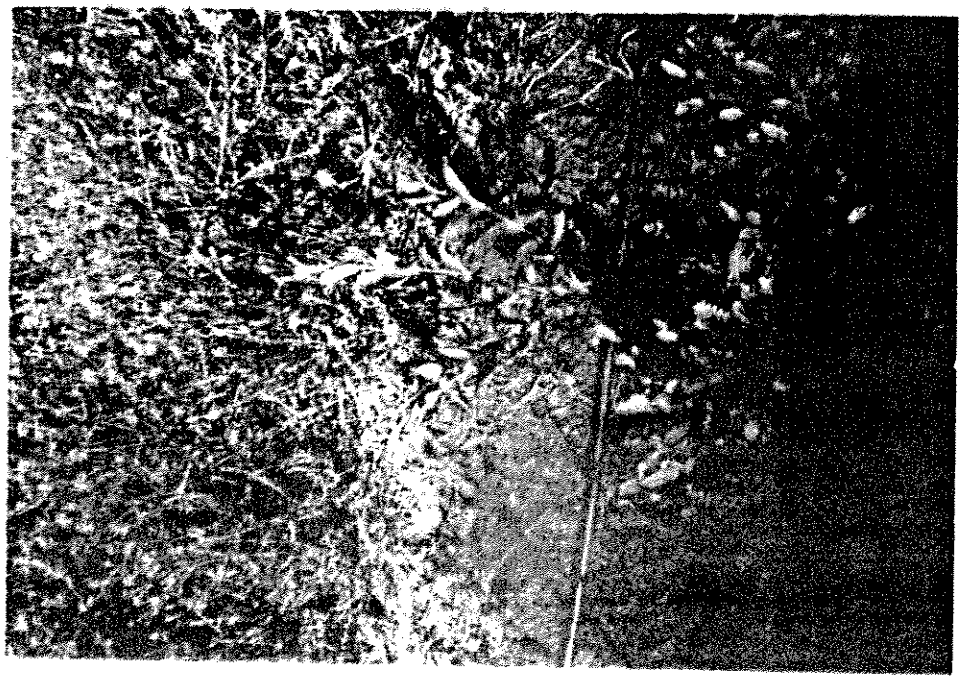
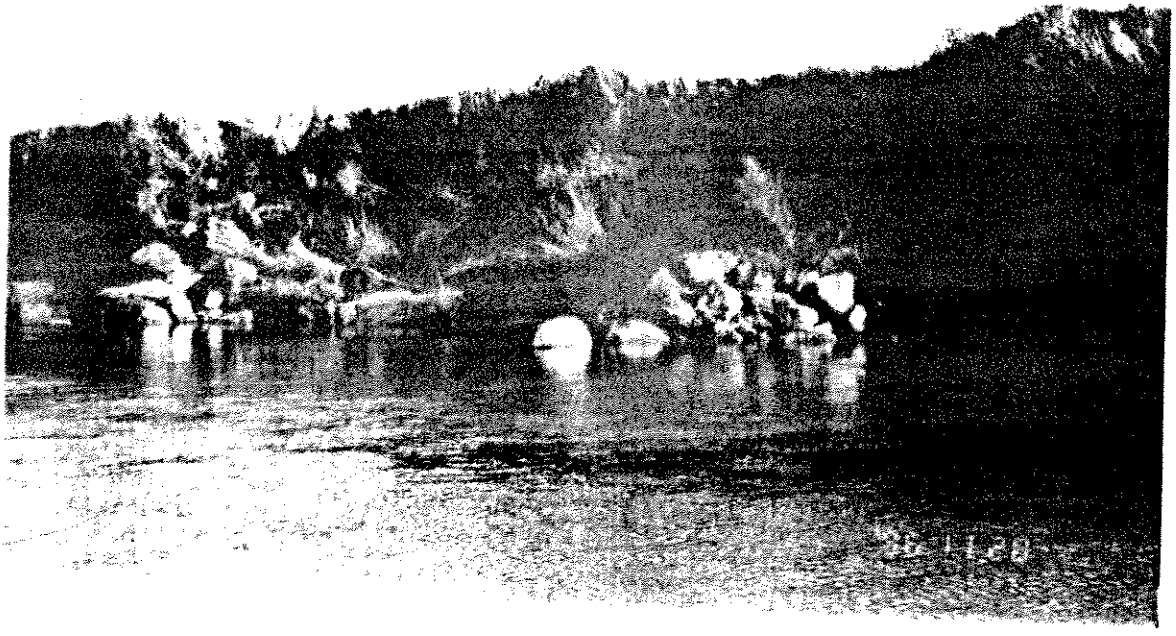
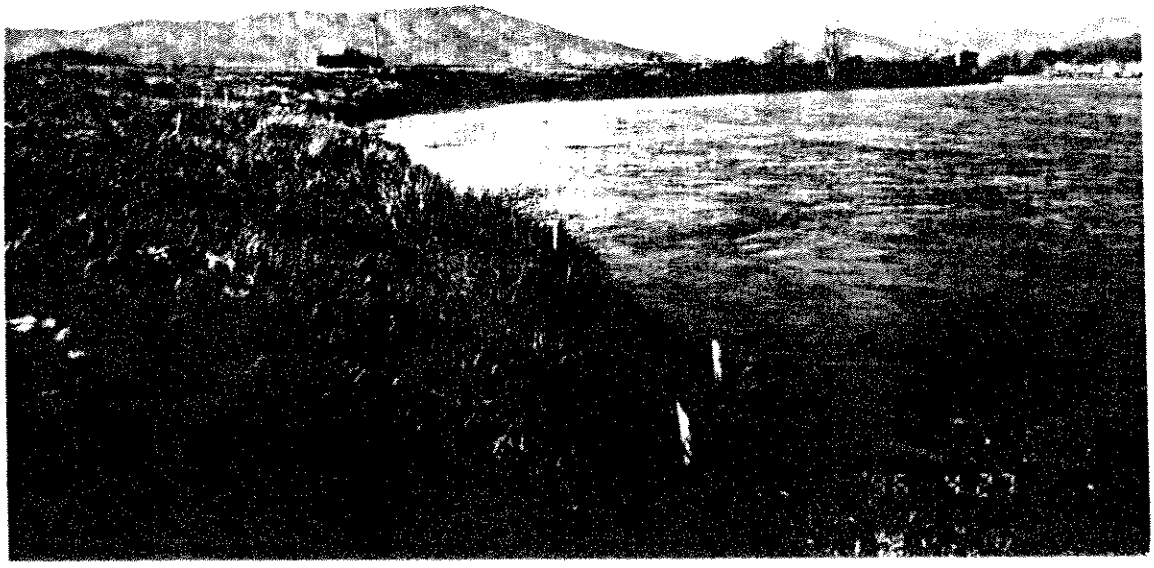


Figure 6. Cottonwood one month after planting. Note current specie ~~cover~~ of ground cover is Yellow Star Thistle which is not shade tolerant.

Before photo (above) and one year after project completion photo (below) of a segment within the Eller Lane project. Note: Bank was not mechanically laid back. The collection of silt built the bank up naturally. Revegetation strategy was to plant cottonwood and willow posts.





Above: Cotton wood and willow post planting demonstration within Eller Lane Project.
Below: Growth of willow post after one season.